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FORMALDEHYDE'S PERSISTENCE AND EFFECTS ALONG THE PRODUCTION OF TOFU CHIPS BASED ON PHYSICOCHEMICAL AND SENSORY CHARACTERISTICS

KETAHANAN FORMALDEHIDA DAN PENGARUH PENGGUNAANNYA SEPANJANG PRODUKSI KERIPIK TAHU BERDASARKAN SIFAT FISIKOKIMIAWI DAN SENSORIS

THESIS

Submitted to the Faculty of Agricultural Technology as partial fulfillment of the prerequisites for obtaining the Bachelor Degree in Food Technology

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SEMARANG
2007

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PREFACE

First of all, the author would like to express the greatest of gratitude to The Lord above. Thank God for His blessings and helps, as well as guidance as the author worked on this thesis. This thesis have had a great impact to the author, as it dramatically increased author's writing ability, deepen author's knowledge on food science, and allowed the author to learn many important things in life.

Of course, this thesis was completed with the help of many people, whether they are directly or indirectly involved in the process. Some of them lent their hands during the research, and some of them offered answers to questions that had arose during thesis-compiling. Author would like to express gratitude to them, and these spaces are exclusively dedicated to them. They are :

1. Victoria Kristina Ananingsih, ST. , MSc. who had given great amount of helps, supports, as well as encouragement as the author's lecturer, supervisor I, and the Dean of the Faculty of Agricultural Technology.
2. Dipl.-Ing. Fifi Sutanto-Darmadi, who had given considerable amount of supports and knowledge especially on drying topic, as the supervisor II on the thesis project and many more as the author's lecturer.
3. Prof. Dr. Budi Widianarko; Lindayani, PhD.; Laksmi Hartajanie, MSc.; Probo Nugrahedi, MSc.; Ita Sulistyawati, MSc.; Sumardi, MSc.; Bernadetta Soedarini, MP.; Ch. Retnaningsih, MP.; Rika Pratiwi, MSi.; Inneke Hantoro, STP.; Gijsbert Peter, MSc.; Lucia Sri Lestari, MSc.; Yovita Dyah, ST.; and Binardo Adiseno, STP. who had share their invaluable knowledge to the author during his almost 4 years of study.
4. Mr. Supriyana, Mr. Kuntoro, Mr. Atmaji, and Miss Endah, as the laboratory assistants. Without their incredible help, the research would have been a mess.
5. The administration staff and employees, for providing great services during the study.
6. Mom and Dad, who had assisted me in every steps and in every aspects along the way, as well as giving me all that I have. They are the best parents in the world. This thesis would not look half as good without them. This thesis is dedicated to you.
7. Ardo Septama, who had helped me in many indirect means.

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8. Theresia Christiani, who had provided the author with so many help and supports that I could not count them, especially for her undying love, all the way in my years of study.
9. Kebo, Wahyu, and Edo, as my best friends in Food Technology Department, and as the comrades whom I had shed sweat with in pursue of the Bachelor Degree in Food Technology. I am very relieved to have your help as well as disturbances along the way.
10. Jason and Mbahe, my best friends ever. Catch up with me guys.
11. Yoenoes, Untung, Rajesh, Stefanus, Doni, Anton, Rudi, Maya, Saboet, and the rest of the 2003 students. Wish you all the best.
12. Alvin Kurniawan, who did not make it through. May you find peace. This thesis is also dedicated to you.
13. Bayu, Ricky, Leo, Andi, Memed, Alfonso, Francesco, Aprilia, and every 2004 and 2005 students, who had assisted me by offering various questions that had deepen my knowledge on food science, as well as some of their prayers wishing me the best I can get. I wish you all the best of luck.
14. All other parties who have contributed by their efforts or attentions that I cannot possibly mention them one by one, I really appreciate it.

In the end, I hope that this thesis would be found useful to anyone who reads it like I found reading other people's thesis and journals is very helpful during the compilation of this thesis. I hope that this thesis could inspire anyone who reads it to write an even better one.

Semarang, February 2007

Author,

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SUMMARY

Tofu is a highly perishable product due to its high moisture content and richness in nutrition. Many ways can be done to extend tofu's shelf life, such as applying drying process and applying preservative agents. Many tofu producers used formalin as a preservative agent, because it is cheap. Formalin itself is not a food preservative due to its toxic nature and carcinogenic effect. The use of formalin in food has been prohibited in many countries, including Indonesia. Food processing, e.g. drying may also be applied to extend tofu's shelf life as well as providing product diversification. Drying is a process to remove water from a solid food product, such as regular firm tofu, by using gas as the carrier of the water. By applying drying process, the tofu can be used to make tofu chips, which have longer shelf life. This research was done to study formaldehyde's persistence throughout the production of the tofu chips, which encompasses storage of tofu by soaking in fresh water, drying, and deep fat frying. This study also aimed to determine the effect of formaldehyde on the tofu chips' quality based on chemical, physical and sensory characteristics. This research started with the production of tofu. Then, some of the tofu were soaked in 2 % formalin solution, while some were not. Both samples were then soaked in fresh water in closed basins as storage for 1 and 2 days. Both samples were then dried using three drying methods : cabinet drying, solar tunnel drying, and sun drying. The dried samples were then fried using deep fat frying at 180°C to produce tofu chips. Chemical, physical, and sensory analysis were then performed. The samples' moisture content were analyzed on each hour of drying process and after the frying process. Formaldehyde content analysis was performed on tofu, dried tofu, and tofu chips. Physical analysis was done to measure the tofu chips' crispiness, and sensory analysis was done to determine consumers' liking to tofu chips. Results show that storage, drying, and frying all reduced formaldehyde content, however none of the process was able to completely remove the formaldehyde content. Results also show that higher drying temperature produced harder tofu chips, and that formalin sharply increased tofu chips' hardness and therefore reduced the crispiness. Sensory analysis results show that panelists preferred tofu chips without formalin to the ones with formalin, and tofu chips produced by sun drying method to the ones produced by the other drying processes.

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RINGKASAN

Tahu termasuk produk pangan yang mudah rusak karena kadar air dan kandungan gizinya yang tinggi. Terdapat banyak cara untuk memperpanjang umur simpan tahu, seperti menambahkan bahan pengawet dan melakukan proses pengeringan. Banyak produsen tahu yang menambahkan formalin pada tahu yang mereka produksi sebagai bahan pengawet, karena harganya yang murah. Formalin sendiri bukanlah bahan pengawet makanan, yang disebabkan karena formalin adalah senyawa beracun dan memiliki efek karsinogenik. Penggunaan formalin sebagai bahan tambahan dalam makanan sendiri sudah dilarang di banyak negara, termasuk di Indonesia. Proses pengolahan seperti proses pengeringan dapat digunakan untuk memperpanjang umur simpan tahu sekaligus memberikan keragaman produk dengan bahan dasar tahu tahu. Pengeringan adalah suatu proses menghilangkan air dari bahan pangan padat, seperti tahu, dengan menggunakan gas sebagai pembawa air. Dengan menggunakan proses pengeringan, tahu dapat digunakan untuk membuat keripik tahu, yang memiliki umur simpan yang lebih panjang. Penelitian ini dilakukan untuk mempelajari ketahanan formaldehida selama proses produksi keripik tahu, yang meliputi penyimpanan dengan perendaman di air bersih, pengeringan, dan penggorengan. Penelitian ini juga bertujuan untuk mempelajari pengaruh penambahan formaldehida pada kualitas kimiawi, fisik, dan sensoris keripik tahu. Penelitian ini diawali dengan pembuatan tahu. Sebagian tahu kemudian direndam dalam larutan formalin 2%, sementara sebagian tidak. Semua sampel kemudian direndam dalam air bersih dalam baskom tertutup selama 1 dan 2 hari. Sampel kemudian dikeringkan dengan 3 metoda pengeringan : *cabinet drying*, *solar tunnel drying*, dan *sun drying*. Tahu kering selanjutnya digoreng menggunakan metoda *deep fat frying* pada suhu 180° C untuk mendapatkan keripik tahu. Selanjutnya dilakukan analisa kimiawi, fisik, dan sensoris. Kadar air sampel diukur pada tiap jam pengeringan. Analisa kuantitatif formaldehida dilakukan pada sampel tahu, tahu kering, dan keripik tahu. Analisa fisik dilakukan untuk mengukur tingkat kerenyahan keripik tahu, dan analisa sensoris dilakukan untuk mengetahui tingkat kesukaan konsumen terhadap keripik tahu yang berbeda. Hasil penelitian menunjukkan bahwa proses penyimpanan, pengeringan, dan penggorengan dapat menurunkan kadar formaldehida dalam tahu, tetapi tidak dapat menghilangkan kandungan formaldehida secara tuntas. Hasil penelitian juga menunjukkan bahwa suhu pengeringan yang lebih tinggi akan menghasilkan keripik tahu yang lebih keras, dan penggunaan formalin menghasilkan keripik tahu yang keras dan kurang renyah. Analisa sensoris menunjukkan bahwa panelis lebih menyukai keripik tahu tanpa formalin, dan lebih menyukai keripik tahu yang dibuat dengan metoda pengeringan *sun drying* daripada keripik tahu yang dibuat dengan metoda pengeringan yang lain.